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A ROTATOR USED IN INSECTICIDE STUDIES

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The rotator herein described has given satisfactory service in turning apples while insecticides were being sprayed on the fruit in tests with the larvae and eggs of the codling moth (Carpocapsa pomonella L.). The apparatus carries six apples through a circular path about 8 inches in diameter and at the same time rotates each apple on its own axis. The materials used in the construction of the apparatus are available in almost every community and may be assembled in a laboratory. The cost is relatively low.

The rotator (fig. 1) was mounted on the cast-iron base (1) of a discarded letter press. It is similar to the stands commonly used in chemical laboratories, but is larger. The base (1) is 11 by 17½ by 1½ inches, and the upright rod (2) is 32 inches long. The rod (2) is threaded at the lower end and fastened to the base of the stand by two nuts. A rotator of this type could be mounted on a table, bench, or other type of base.

The main wheel of the rotator is the front wheel of an old automobile mounted on its own axle. The axle is bolted to the base of the stand so that the wheel rotates in a horizontal plane. The lower edge of the rim of the wheel (4) is covered with friction tape commonly used for insulating electric wires, where such wires are joined together. This tape makes a good surface by which to rotate the wheel. It is sticky, easily applied, inexpensive, and may be renewed frequently and in a short time if necessary.

Fastened around the spokes of the main wheel are three wires (5). The six ends of these three wires extend up and support the six small wheels at the top of the rotator. These wires are fastened to the main wheel with staples. The wires should be stiff enough to support the small wheels adequately but as small in diameter as possible to allow the spray material to pass through between them. No. 9 galvanized wire has been found satisfactory.

A hole was bored through the end of the hub cap (7) and 3/16 inch iron rod (8) that had been twisted so that a loop was formed, was fastened to the axle by slipping the threaded end of the axle through the loop and then tightening the lock nut. To prevent spray material from draining down the twisted rod (8) into the main wheel bearing, a cover (9) was suspended over the hole in the hub cap. This cover (9) was made of leather and fastened to the twisted rod (8) with friction tape so that the hub cap could turn freely under it.

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[1] The multigraphed circulars on Entomological Technic (ET) published by the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, include, as material is available, descriptions of devices or methods employed by State or other agencies engaged in similar work.

On the upper end of the twisted rod (8), about 11 inches above the main wheel, was mounted a wheel (10) about 6 inches in diameter. As this wheel is stationary, any type of wheel may be used. A discarded timing-gear wheel from an automobile was found to be entirely satisfactory. The surface of this wheel was covered with friction tape to obtain a better surface for the six small wheels to travel around.

The six small wheels were roller-skate wheels mounted on ¼-inch bolts 1¾ inches long that suspended them below the ends of wires attached to the main wheel. On the lower side of each small wheel was soldered a hook (11) made of four strands of light copper wire twisted together. The upper ends of the bolts that passed through the axles of the small wheels were fastened together with pieces of light, perforated strap iron (12) 4½ inches long and ¾ inch wide. Above two of the small wheels an angle iron (13) made of a short piece of strap iron was fastened. Between these two angle irons (13) were stretched rubber bands (14) to hold all the six small wheels firmly against the stationary wheel (10) as they traveled around it on the friction tape surface. Where oil sprays are being used, a small spring would probably be more satisfactory than the rubber bands. However, rubber bands have lasted for a month or more when tests were being run with emulsified oils dispersed in water.

The apples (15) were suspended by tagged strings (16) from the hooks (11) below the small wheels.

The power to drive the wheels was derived from a small electric motor (17). To reduce the speed at which the rotator turned a No. 13 rubber stopper (18) was wrapped with friction tape and mounted between two roller-skate wheels (19). These wheels (19) were held in place by test-tube clamps (20). The drive shaft (21) of the electric motor (17) transmitted its power to the circular surface of the large rubber stopper (18). On the lower end of the axle on which this stopper (18) was mounted was slipped a 1½-inch length of thick-walled rubber tubing (22). The bolt which served as an axle extended only about half way through this piece of tubing. The free end of the tube (22) transmitted the power to the friction-tape surface on the rim of the main wheel (4), in this manner turning it at a reduced speed. A light galvanized-iron shield is placed over the motor during the actual spraying operation.

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Figure 1. - Rotator, with parts numbered for easy identification.

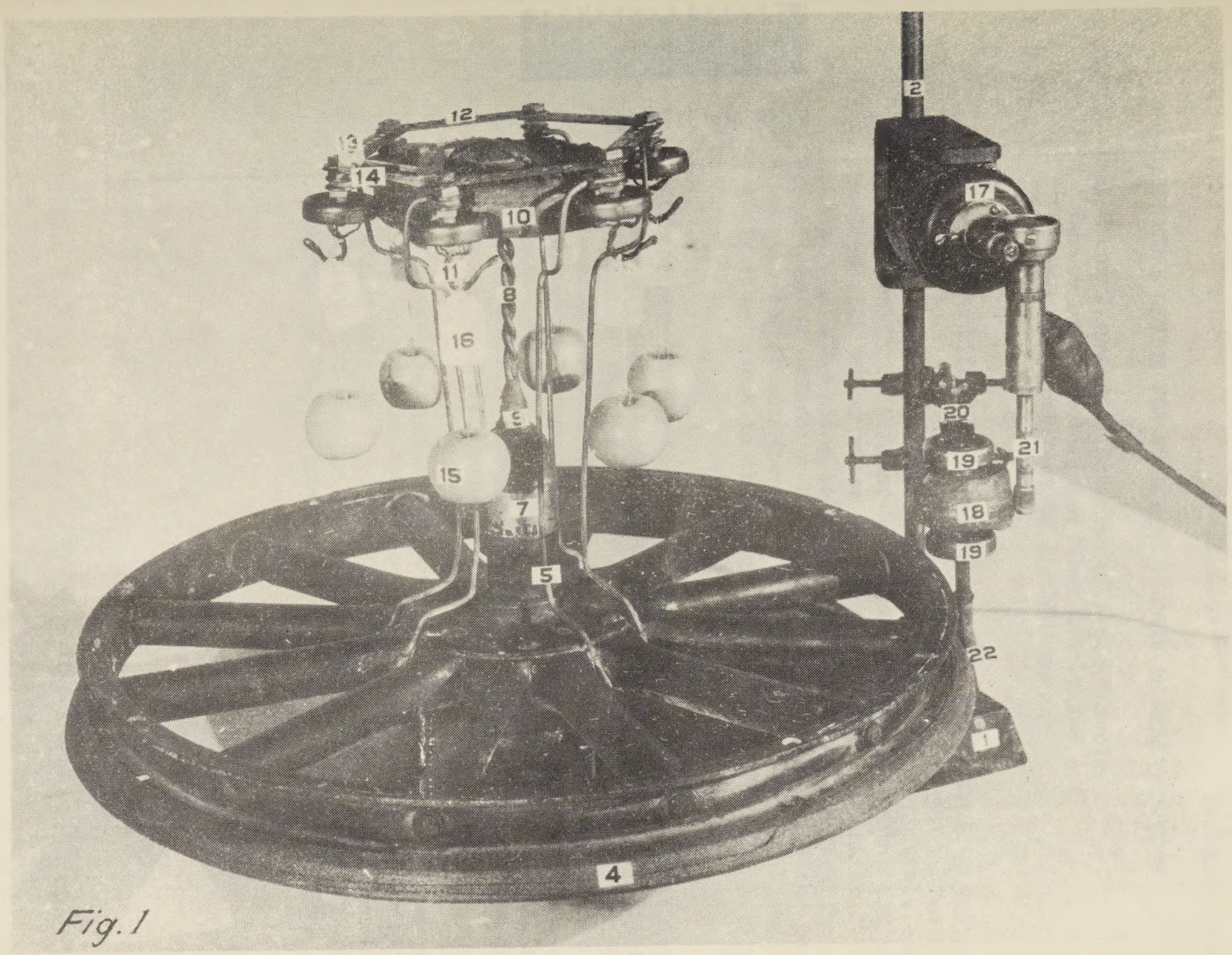

Fig. 1